Toxics Use Reduction Institute

Pick One : How to Replace Your Current Cleaning Solvent

Using
CleanerSolutions
www.cleanersolutions.org

An On-Line Tool for Solvent Substitution
in Surface Cleaning

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What Has SSL Done

- As a technical assistance provider since 1993
  - SSL has helped hundreds of companies find safer alternatives to hazardous cleaning solvents
  - Implementation rate for lab is 3X higher than the national average for P2 technical assistant providers
    - Over 1/3 of the companies fully adopt the lab's recommendations

Three Types of Cleaning

- Parts Cleaning
  - During and after manufacturing in metal working or tooling industries
  - Gross Cleaning Applications
- Precision Cleaning
  - During and after manufacturing in Semi Conductor and Medical Sectors
  - Critical Cleaning Applications
- Facility Cleaning
  - Janitorial or housekeeping chores in public/private institutions such as schools or hospitals
  - Institutional Cleaning Applications

Technical Assistance

- The goal of the lab is to assist industry in the search for safer cleaning processes
  - Providing one-on-one assistance tailored to the needs of the client
  - By promoting and developing safer alternatives to hazardous solvents

Find a Safer & Effective Alternative

- *CleanerSolutions* Database
  - Used to identify safer and effective products
    - Safety Screening
      - VOC, ODP, GWP, HMIS/NFPA, pH
    - Matching Performance
      - Contaminant, substrate, equipment, current solvent
- www.cleanersolutions.org

CleanerSolutions Database

- From the testing performed at SSL
  - Performances of industrial and institutional cleaning products
  - Database system created for quick and easy access to this resource
  - Data is field-searchable
    - Surface contaminants
    - Substrates
    - Cleaning equipment
    - Solvents replaced

Meeting Goals

- Previous versions of the database had been used to meet most of our objectives:
  - Aiding companies in finding process-specific cleaning alternatives
  - Technology transfer of innovative cleaning methods
  - Evaluating alternative cleaners

The Whole Truth

- Last objective listed was only partially addressed
  - One aspect of evaluating cleaners, when does the product not work, had been left out
    - This information can be just as important as when the product is effective
    - Complete picture of the overall effectiveness of a cleaner
- Database includes
  - Every trial run
  - Every product tested
  - Every client serviced at SSL

How the Database Can Help

- Generate a list of alternatives
- Track testing results
  - Identify effective and ineffective alternatives
- Improve chances of selecting alternatives that will work
  - Similar projects can move faster based on past successes and failures

Selecting Alternatives

Replacing TCE in RI

- Partnering with EPA Region 1 and HQ
  - Preliminary testing on supplied buffing compounds and mostly brass parts
- Conducted hands-on workshop for small plating shops – Fall ‘06
  - 14 companies
- On-site implementation assistance
  - Worked with 6 companies so far
  - Replaced TCE with aqueous products

Parts Cleaned

21 Vendors
26 Products

Company	Product	Effective	Ineffective	Total
Alconox Inc	Detergent 8	22	2	24
AW Chesterton	KPC 820 N		1	1
Brulin Corporation	Brulin 1990 GD		1	1
Brulin Corporation	Aquavantage 1400	3	1	4
Buckeye International	XL 100	3	4	7
Fine Organic Corporation	FO 2085 M		1	1
Gemtek Products	SC 1000		1	1
Gemtek Products	SC Aircraft & Metal Cleaner		1	1
Hubbard Hall Inc	Ultrasoak 127	2		2
Hubbard Hall Inc	Aquacleen		1	1
International Products Corp	Micro 90	1	3	4
International Products Corp	Surface Cleanse 930	3		3
JacksonLea	Cleanol CS 336	1		1
MacDermid Industrial Products	ND 17		1	1
Magnaflux	Daraclean 283	11	6	17
Man Gill Chemical Company	Gillite 0650 Cl	2	3	5
Matchless Metal Polish Co	MC 132	9	5	14
Oakite Products	Inproclean 3800	5	7	12
Savogran Company	Dirtex Prepaint Cleaner		1	1
Simple Green	Crystal Simple Green Cleaner		1	1
Sky Products Company Inc	Cleaner #10		1	1
Texo Corporation	Texolite 1734 XL		2	2
Today & Beyond	Beyond 2001		3	3
Today & Beyond	Beyond 2003		1	1
US Polychem Corporation	Polyspray Jet 790 XS	34	6	40
Warren Chemical Company	Sea Wash Blue	4		4

Developing New Alternatives

Developing Safer Alternatives to Hazardous Vapor Degreasing

- Testing conducted by TURI's Lab in collaboration with Creative Enterprizes

- Azeotrope Cleaning
  - Possible Replacements for Vapor Degreasing Solvents
- Four binary azeotropes
  - Solubility characteristics (HSP) and boiling point are quite different
  - Could solve a very broad range of problems
  - Based on water

Solvents to Evaluate

- Primary Component
  - Water
- Secondary Components
  - Tert-Butyl Acetate (t-BAc)
  - Methyl Acetate (MeOAc)
  - Propylene Glycol Methyl Ether (PGME)
  - Heptane

Identify Problem Areas

- Soil selection from *CleanerSolutions*

Previous Solvent	Soil	CAS	Chemical Identity
•TCE •n-PB	**Castrol Quench G oil**	64742-55-8	Hydrotreated light paraffinic petroleum
		64742-65-0	Distillates (Petroleum), Solvent-Dewaxed Heavy Paraffinic; Petroleum Base Oil; Petroleum Lube Oil
		8052-42-4	Asphalt (petroleum)
•PCE •n-PB	**Cargill, Inc Canola Oil**	120962-03-0	Canola Oil
•PCE •n-PB	**C.P. Hall Co. Plasthall ESO Oil**	8013-07-8	Soybean oil epoxidized
•PCE •HFE 71DE •AK 225 •Vertrel CCA	**Soltex Polybutene 32**	9003-29-6	Polybutene

Performance Testing

- Preweighed aluminum coupons were coated with soil with a hand held swab
- Weighed again to determine the amount of oil applied
- Three coupons were cleaned for 5 minutes
  - At the boiling point
  - Rinsed for 15 seconds in 120 F tap water
  - Dried for 30 seconds with compressed air at room temperature
- Weighed a third time to determine the amount of oil remaining
- Efficiencies calculated

Initial Results

Azeotrope	Soil 1	Soil 2	Soil 3	Soil 4
Methyl Acetate	99.9	99.5	98.1	94.4
t-Butyl Acetate	94.5	98.4	99.5	99.4
Propylene Glycol Methyl Ether	89.4	60.3	83.9	36.5
Heptane	100.0	99.9	98.6	99.8

HSP Predicted Results

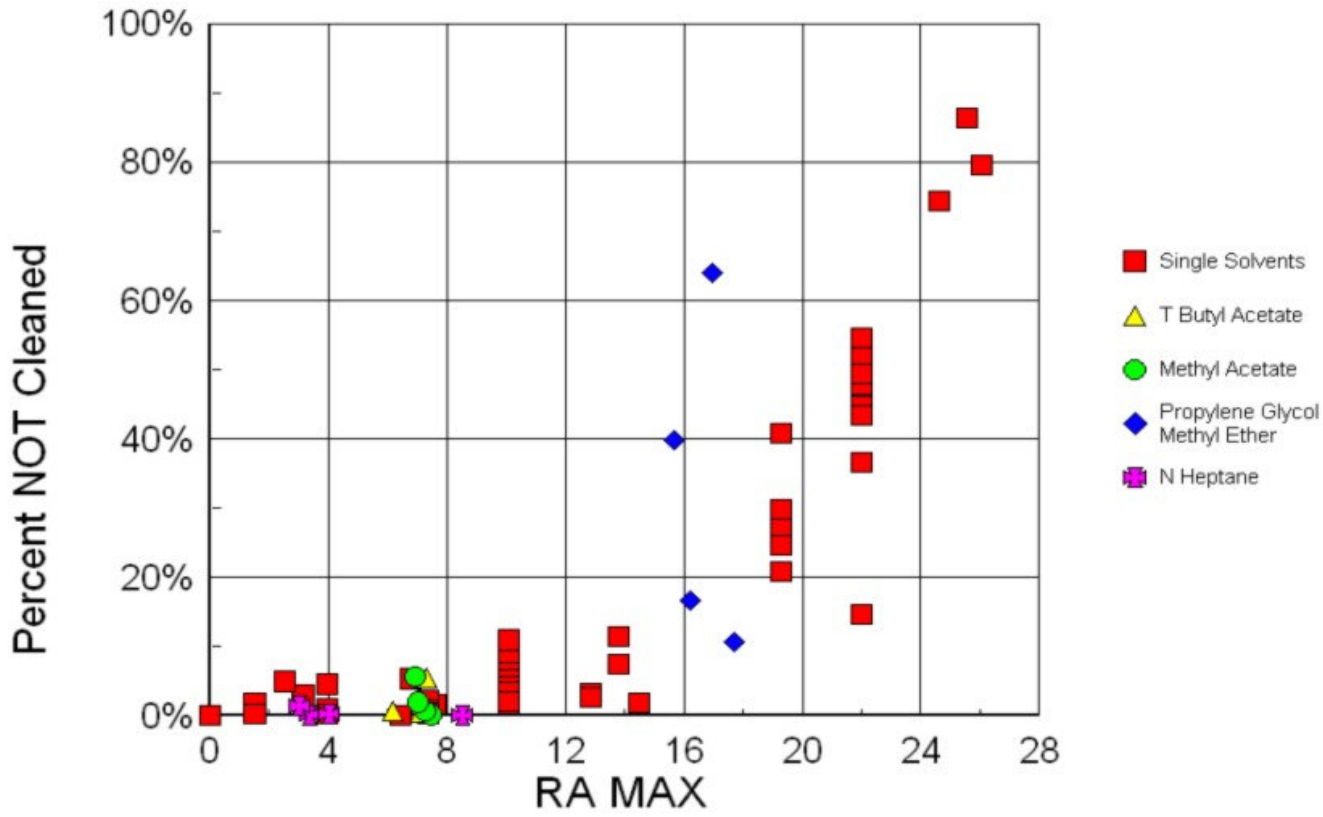


Figure courtesy of J. Durkee

Azeotrope Results in Perspective

- (1) similar to single solvent results
- (2) azeotropes chosen with these soils performed pretty much as anticipated

- RA is the HSP distance between solvent/ azeotrope and soil and % un-clean is the % soil left

- Or -

  - Larger RA number => less likely the solvent would clean the soil

Next Steps

- Evaluate top azeotropes using vapor phase for cleaning and rinsing
- Expand testing as justified by additional end uses
  - More azeotropes
  - More soil conditions

How *CleanerSolutions* Works

A Simple Solution for Solvent Substitution for Surface Cleaning

More about the CleanerSolutions On-Line Tool

TURI Laboratory Client and Test Results

Search information generated from testing conducted at TURI's Laboratory. Results are linked to client testing information to help you select an alternative that will match your needs.

Find a Cleaner
Identify alternatives that have cleaned your contaminant.

Replace a Solvent
Find alternatives to your current solvent cleaner.

Safety Screening Search
Find products based on safety and environmental criteria.

Browse Clients and Trials
Look through past lab clients by industry.

Vendor Supplied Information

Search vendor-supplied information for an alternative cleaner. Testing performed by TURI for listed products also are displayed.

Search Vendor Information
Search for products based on vendor recommended uses.

Browse Vendors and Products
Find vendors by name.

NEW! Material Safety Data Sheets and Technical Data Sheets for most products are now available on each Product Information page.

Forms

Vendor Forms
Forms for submitting product information to the lab.

Client Test Request Form
Forms to arrange for testing for your company.

Finding a Cleaner

Find a Cleaner

By searching for a cleaner that has successfully removed a contaminant similar to your own, chances are that the alternative also will work for you. Optionally, you can add substrate and equipment criteria to help narrow your search.

Required Field
You must select one or more contaminants.

Optional Fields
Filter your search by substrate or equipment type, or leave these fields set to *Any* to include all results for a given contaminant.

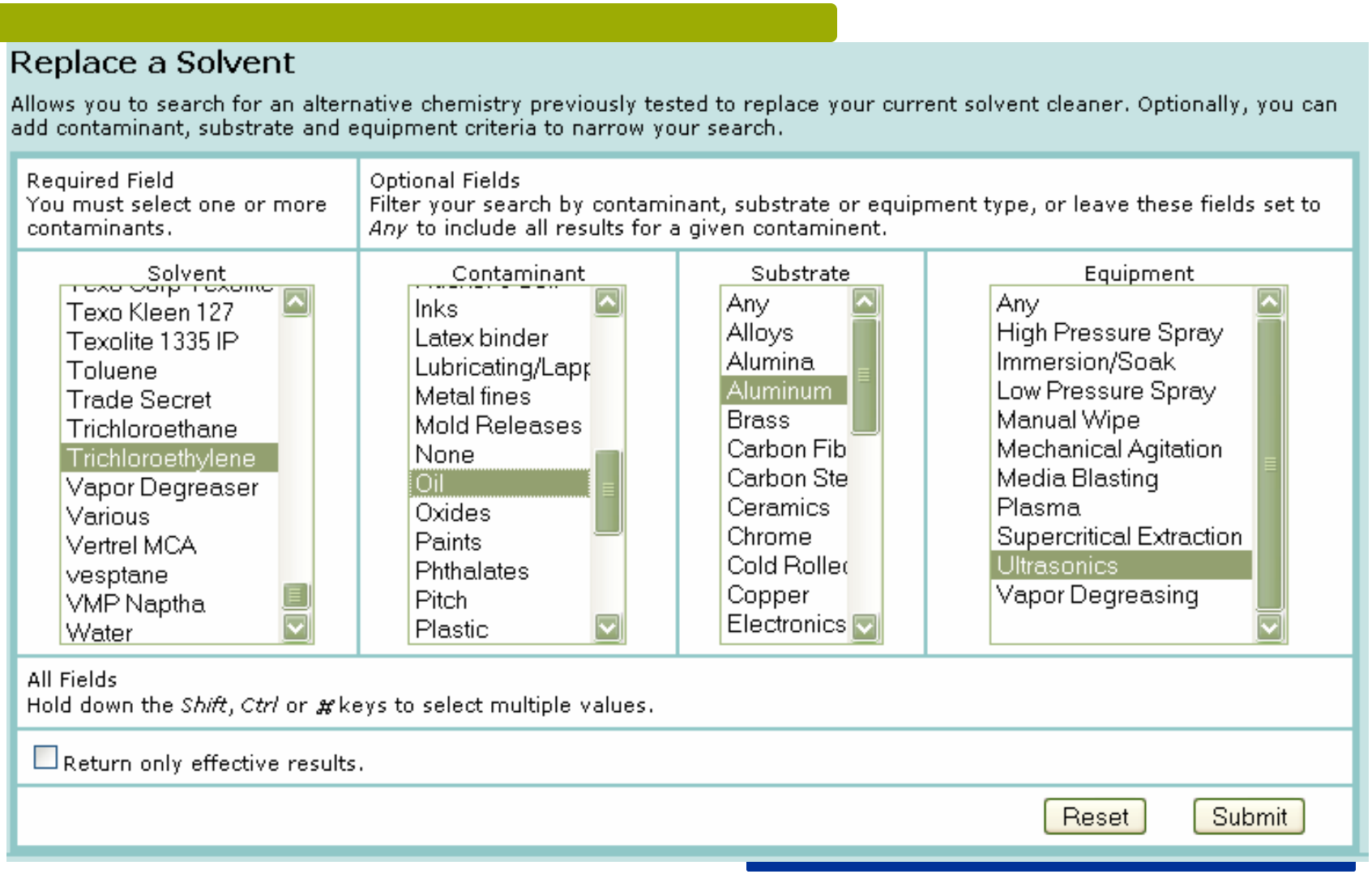
Contaminant	Substrate	Equipment
Inks	Any	Any
Latex binder	Alloys	High Pressure Spray
Lubricating/Lapping Oil	Alumina	Immersion/Soak
Metal fines	Aluminum	Low Pressure Spray
Mold Releases	Brass	Manual Wipe
None	Carbon Fiber	Mechanical Agitation
Oil	Carbon Steel	Media Blasting
Oxides	Ceramics	Plasma
Paints	Chrome	Supercritical Extraction
Phthalates	Cold Rolled Steel	Ultrasonics
Pitch	Copper	Vapor Degreasing
Plastic	Electronics	

All Fields Hold down the *shift* or *ctrl* keys to select multiple values.

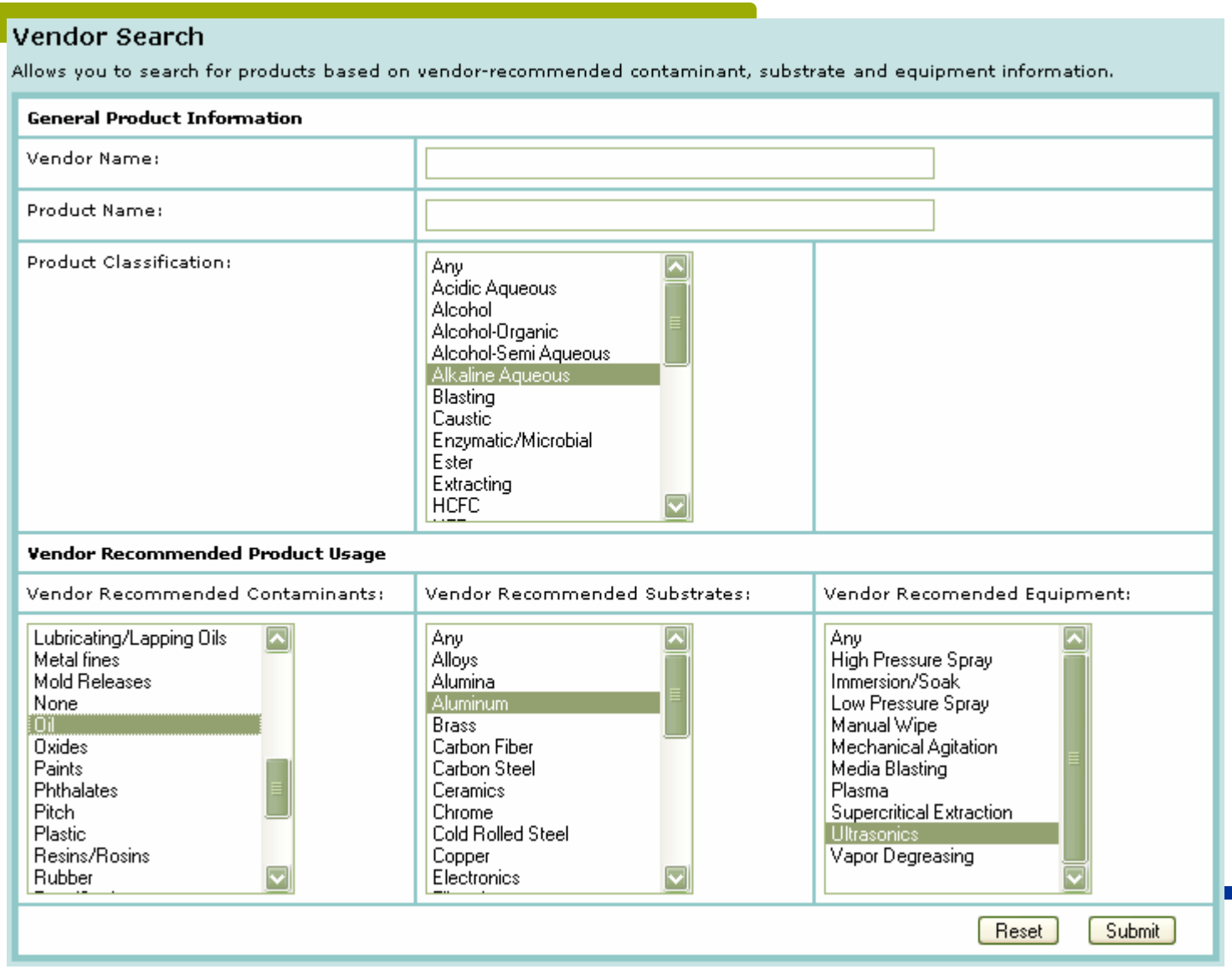
☐ Return only effective results.

Reset Submit

Replacing a Solvent



Search Vendor Data



Search for a Vendor

Contact information for vendors.

Company Name	
Product Name:	Submit

A - C | D - F | G - I | J - M | N - O | P - S | T - Z

T & D Precision Finishing Route 197 Dudley, MA 01571	**Phone**	**Internet**
Tarksol Inc PMB-300 3400 Ridge Road W Rochester, NY 14626	**Phone** Local: 585 663 3346 Fax: 585 621 2303	**Internet** Website: www.tarksol.org
Tech Spray Inc P O Box 949 Amarillo, TX 79105	**Phone** Toll Free: 800 858 4043 Local: 806 372 8523 Fax: 806 372 8750	**Internet** Website: www.techspray.com
Texo Corporation 2801 Highland Avenue Cincinnati, OH 45212	**Phone** Local: 513 731 3400	**Internet**
The Clean Environment Co Box 4444, 8609 I Street Lincoln, NE 68504	**Phone** Toll Free: 800 266 2353 Local: 402 464 0988 Fax: 402 537 0014	**Internet** Website: www.cleanenvironmentco.com
Today & Beyond P O Box 690 Ashland, OH 44805	**Phone** Local: 419 943 2628 Fax: 419 945 2513	**Internet**

Search Results

Contaminant Search Results | Search Again

Current Search Information

Search Criteria	Results	Help
Contaminant: Oil Substrate: Aluminum Equipment: Ultrasonics	Found 43 records Showing records 1 - 43	Search Results Field Definitions Contact the lab

<< < **Showing records 1 - 43 of 43** | Field Definitions > >>

Company Name / Product Name	Safety Score	Classification	Contaminant	Substrate	Equipment	Client # / Project # / Trial #			Effective
Oakite Products Inproclean 2500	47	Powder Detergent	Oil	Aluminum	Ultrasonics	67	1	0	
Buckeye International Shopmaster	46	Alkaline Aqueous	Oil	Aluminum	Ultrasonics	57	1	0	
International Products Corporation Micro	46	Alkaline Aqueous	Oil	Aluminum	Ultrasonics	57	1	0	
Magnaflux Daraclean 282	36	Alkaline Aqueous	Oil	Aluminum	Ultrasonics	57	1	0	
Matchless Metal Polish Company MC 580	39	Alkaline Aqueous	Oil	Aluminum	Ultrasonics	57	1	0	
Oakite Products Inproclean 3800	42	Alkaline Aqueous	Oil	Aluminum	Ultrasonics	57	1	0	
US Polychem Corporation Polychem A 2000 XS	45	Alkaline Aqueous	Oil	Aluminum	Ultrasonics	57	1	0	
Warren Chemical Company Sea Wash Neutral	50	Neutral Aqueous	Oil	Aluminum	Ultrasonics	57	1	0	
Water Water	50	Neutral Aqueous	Oil	Aluminum	Ultrasonics	57	1	0	
Magnaflux Daraclean 235	46	Neutral Aqueous	Oil	Aluminum	Ultrasonics	11	1	0	
Magnaflux Daraclean 235	46	Neutral Aqueous	Oil	Aluminum	Ultrasonics	11	1	0	
Bio Chem Systems Bio T Max	37	Terpene-Semi-Aqueous	Oil	Aluminum	Ultrasonics	7	2	2	

<< < **Showing records 1 - 43 of 43** > >>

Product Profiles

Product Information

Formula 815 GD

Vendor Provided Information

Product information cited in this section is supplied directly by the vendors. The Institute has not verified the accuracy of any of this information and is not liable for any claims made by the vendors. TURI is likewise not responsible for any typographical errors.

Vendor Name: Brulin Corporation

Product Classification: Alkaline Aqueous

Recommended Contaminants: Buffing/Polishing Compounds, Carbon Deposits, Cutting/Tapping Fluids, Greases, Lubricating/Lapping Oils, Oil

Recommended Equipment: Immersion/Soak, Mechanical Agitation, Ultrasonics

Recommended Substrates: Alloys, Aluminum, Brass, Carbon Steel, Ceramics, Copper, Galvinized Steel, Gold, Nickel, Plastic, Rubber, Stainless Steel, Steel, Sterling/Silver

MSDS / TDS: Formula 815 GD MSDS

Safety Score | Help

Indicator	Value	Points
VOC:	1.1	10
GWP:	0	10
ODP:	0	10
HMIS H:	1	
HMIS F:	0	9
HMIS R:	0	
pH:	11.6	6

Total: 45

Laboratory Evaluation of Formula 815 GD | Field Definitions

Client #	Project #	Trial #	Contaminant	Substrate	Equipment	Effective
1	1	0	Carbon Deposits	Aluminum	Ultrasonics	●
1	1	0	Dirt	Aluminum	Ultrasonics	●
8	1	1	Stickies	Textile	Immersion/Soak	●
13	1	0	Lubricating/Lapping Oils	Aluminum	Immersion/Soak	●
13	1	0	Lubricating/Lapping Oils	Stainless Steel	Immersion/Soak	●
13	1	1	None	Steel	Immersion/Soak	●
13	1	1	None	Alloys	Immersion/Soak	●
13	1	1	None	Aluminum	Immersion/Soak	●

Laboratory Evaluation

28	1	0	Oil	Aluminum	Immersion/Soak	●
28	2	0	Oil	Aluminum	Immersion/Soak	●
28	2	1	Oil	Aluminum	Immersion/Soak	●
28	2	2	Cutting/Tapping Fluids	Aluminum	Immersion/Soak	●
29	1	0	Greases	Steel	Immersion/Soak	●
29	1	1	Greases	Steel	Immersion/Soak	●
29	1	1	Oil	Steel	Immersion/Soak	●
29	1	1	Greases	Steel	Immersion/Soak	●
49	1	1	Oil	Aluminum	Immersion/Soak	●
49	1	1	Oil	Aluminum	Immersion/Soak	●
49	1	1	Oil	Aluminum	Immersion/Soak	●
49	1	1	Oil	Brass	Immersion/Soak	●
49	1	1	Oil	Brass	Immersion/Soak	●
49	1	1	Oil	Brass	Immersion/Soak	●
49	1	1	Oil	Copper	Immersion/Soak	●
49	1	1	Oil	Copper	Immersion/Soak	●
49	1	1	Oil	Copper	Immersion/Soak	●
49	1	1	Oil	Stainless Steel	Immersion/Soak	●
49	1	1	Oil	Stainless Steel	Immersion/Soak	●
49	1	1	Oil	Stainless Steel	Immersion/Soak	●
67	1	0	Oil	Aluminum	Ultrasonics	●

Worked

Didn't Work

67	1	0	Oil	Aluminum	Ultrasonics	●
67	1	0	Oil	Steel	Ultrasonics	●
67	1	0	Oil	Steel	Ultrasonics	●
67	1	0	Oil	Aluminum	Ultrasonics	●
67	1	0	Oil	Aluminum	Ultrasonics	●
67	1	0	Oil	Steel	Ultrasonics	●
67	1	0	Oil	Steel	Ultrasonics	●
72	2	0	Greases	Steel	Ultrasonics	●
72	2	0	Buffing/Polishing Compounds	Steel	Ultrasonics	●
72	2	0	Greases	Steel	Ultrasonics	●
72	2	0	Buffing/Polishing Compounds	Steel	Ultrasonics	●
72	2	0	Buffing/Polishing Compounds	Steel	Ultrasonics	●
72	2	0	Buffing/Polishing Compounds	Steel	Ultrasonics	●
72	2	1	Buffing/Polishing Compounds	Steel	Ultrasonics	●
72	2	1	Buffing/Polishing Compounds	Steel	Ultrasonics	●
72	2	1	Greases	Steel	Ultrasonics	●
72	2	2	Buffing/Polishing Compounds	Steel	Ultrasonics	●
72	2	2	Buffing/Polishing Compounds	Steel	Ultrasonics	●
72	2	2	Greases	Steel	Ultrasonics	●

Read more about the testing

Project Summary

Parts cleaned

Project Info

Test Reports

Client Number 231 (Manufacturers of Precision Parts and Assemblies)

Client Images:

Project Number 1

Summary: Several trials have been performed for aqueous and non-aqueous based cleaning products. Supplied parts have been cleaned using both methods and sent back to the client for further analysis.

Test Objective: To reduce VOC's

Problems with Current Method: Need to reduce VOC amounts

Purpose of Cleaning: Visual specifications are critical with our components

Product Use: Analytical & chromatorgraphy components

Cleaning Chemicals: LPS Micro X, Alconox, Amberclean Q3

Trial Number	Date Run	Purpose	Success Rating
0	11/08/04	To evaluate aqueous cleaners for potential replacement of contact cleaner.	Results successful using TACT (time, agitation, concentration, and temperature, as well as rinsing and drying) and/or other cleaning chemistries examined.
3	11/12/04	To evaluate alternative contact cleaners.	Results successful using TACT (time, agitation, concentration, and temperature, as well as rinsing and drying) and/or other cleaning chemistries examined.
1	11/08/04	To evaluate cleaners using ultrasonic energy.	A follow up test, usually based on company input.
2	11/09/04	To evaluate products on second supplied contaminant using ultrasonic cleaning	A follow up test, usually based on company input.
4	11/12/04	To reevaluate alternative cleaners under modified conditions	A follow up test, usually based on company input.

Test Reports

Trial Report

Trial Number 0 (Client Number 231, Project Number 1)

Trial Purpose: To evaluate aqueous cleaners for potential replacement of contact cleaner.

Date Run: 11/08/04

Experiment Procedure:
Five products were selected from the lab's database of test results based on the products' past success in removing similar lubricants. Four of the products were diluted to 2% along with the client's current product using DI water in 600 ml beakers. A sixth product was used at full strength as recommended by the manufacturer. All six products were heated to 115 on a hot plate.
Eighteen preweighed 6061 aluminum coupons were coated with Fuch's Lubricants Renocut 6515 NC (mineral oil, vegetable oil) using a hand held swab. Coupons were allowed to sit for over an hour. A second set of weights were recorded to determine the amount of soil added. Three coupons were immersed into each cleaning product and cleaned using minimal agitation provided by a stir bar. Coupons were cleaned for 5 minutes, followed by a 15 second water rinse at 120 F and airblow off for 30 seconds at room temperature. Once dry, final weights were recorded and efficiencies were calculated for each product.

Trial Results
All of the products out performed one of the client's current aqueous cleaners. Three of the products removed over 87% of the lubricant. The table lists the amount of soil added, the amount remaining and the efficiency for each coupon cleaned.

Cleaner	Initial wt	Final wt	% Removed
Amberclean Q3	0.0918	0.0481	47.60
	0.1934	0.0638	67.01
	0.1074	0.0203	81.10
Formula 815 GD	0.2651	0.0983	62.92
	0.1748	0.0528	69.79
	0.2564	0.0552	78.47
Inproclean 3800	0.1845	0.0421	77.18
	0.2610	0.0275	89.46
	0.2194	0.0459	79.08
Surface Cleanse 930	0.2272	0.0076	96.65
	0.2441	0.0255	89.55
	0.2865	0.0085	97.03
Valtron SP 2275	0.2827	0.0518	81.68
	0.2171	0.0205	90.56
	0.5620	0.0471	91.62
Ionox HC2	0.3371	0.0702	79.18
	0.3519	0.0108	96.93
	0.3171	0.0095	97.00

Success Rating
Results successful using TACT (time, agitation, concentration, and temperature, as well as rinsing and drying) and/or other cleaning chemistries examined.

Conclusion
The same six products will be retested under similar conditions. Ultrasonic energy will be added to improve efficiency.

Browse by Client

Browse Clients and Trials

Browse past lab clients by industry sector.

Adhesive

Adhesive Manufacturer (5)

Aircraft

Aerospace Industry (1)
Aircraft Parts Manufacturer (1)
Manufacturer of Motion Control Devices (1)

Chemical

Chemical Company (13)
Chemical Light mfr (1)
Chemical Manufacturer (7)
Cleaner Manufacturer (14)
Coatings Manufacturer (6)
Cutting Fluids Manufacturer (1)
Gas Company (1)
Printing Company (2)

Consulting

Consultant (7)
Consultant-EPA Superator Study (1)
Consultants (2)
Consulting Firm (2)
Environmental Consulting Firm (1)
Environmental Service Firm (2)

Consulting / Metal

Environmental Consultant /Brazing & Heat Treating (1)

Electronics

Capacitor Manufacturer (2)
E-Beam Equipment Manufacturer (1)
Electrical Manufacturer (3)
Electronics Manufacturer (12)
Manufacturer of Ceramic Capacitors (2)
Manufacturer of Computer Parts (1)
Microelectronics Mfr (2)

General

Metal

Aluminum Anodizing Job Shop (1)
Aluminum Job Shop (2)
Bellows Mfr (2)
Bicycle Manufacturer (2)
Bolt, Screw & Nut Manufacturer (1)
Electromagnetic Manufacturer (2)
Forging Operation (1)
Lapping Job Shop (1)
Machining Company (1)
Manufacturer of Cooking Systems (1)
Manufacturer of Security Systems (1)
Manufacturers of Precision Parts and Assemblies (2)
Metal (18)
Metal Finishing (4)
Metal Wire Manufacturer (2)
Metal Working (16)
Name Plate Mfg-Etching (1)
Ornament Manufacturer (1)
Perforated Metals Manufacturer (1)
Silversmith (1)
Stamping Company (1)
Steel Collar Clamp Manufacturer (1)
Tool Manufacturer (2)

Metal-electronics

Manufactures parts for Semi-Conductor Industry (2)

Military

Navy Depot (1)

Optical

Electro-Optical Devices (2)
Light Manufacturer (2)
Optical Coating (1)
Optical Manufacturer (4)
Opto-mechanical manufacturer (1)

P2 Center

Client Project Status

Browse past lab clients by industry sector.

Chemical Company (Chemical)

Client Number	Project Number	Tech Transfer	Implementation	Analysis	In Progress	Test Objective
25	1					Test capability of various solvents and aqueous samples to remove grease from metal chips.
145	1	●				Want test results for Soy Gold products.
146	1					To clean a static mixing tube
182	1		●			Replacement of Methyl Ethyl Ketone as a cleaner for adhesives
190	1		●			Comparison of client products with other vendor products
202	1					To evaluate client supplied cleaner for janitorial cleaning
204	1	●				Generate a list of alternatives to toluene and acetone for manual aluminum cleaning
205	1	●				Database search
225	1		●			To evaluate product as a janitorial cleaner
232	1		●		●	To evaluate supplied product for dishwashing and carpet cleaning
245	1				●	To conduct corrosion test for new product.
245	1		●	●		To conduct corrosion test for new product.
245	2				●	Evaluation of components of Gold Etch Kit - including pre-cleaning system, etching and precipitation methods.
245	2		●	●		Evaluation of components of Gold Etch Kit - including pre-cleaning system, etching and precipitation methods.
257	1				●	To evaluate peformance of supplied products for janitoiral applications

Other Features

- Search by Safety Screening data
  - Safety Screening Criteria
- Side-by-Side product comparisons
- Tracking Search Results

Safety Screening Criteria

- Volatile Organic Compounds
- Global Warming Potential
- Ozone Depletion Potential
- Hazardous Material Information System/ National Fire Protection Association
- pH

Volatile Organic Compounds (VOC)

- Chemicals that evaporate easily at room temperature
  - The term “organic” indicates that the compounds contain carbon
  - VOC exposures are often associated with an odor while other times there is no odor
    - Both can be harmful
  - There are thousands of different VOCs produced and used daily

- Acute
  - Eye irritation / watering
  - Nose irritation
  - Throat irritation
  - Headaches
  - Nausea / Vomiting
  - Dizziness
  - Asthma exacerbation
- Chronic
  - Cancer
  - Liver damage
  - Kidney damage
  - Central Nervous System damage

VOCs

- Source control
  - Eliminate products that have high levels of VOCs
  - Purchase new products that contain low or no VOCs
    - (Environmentally Preferable Purchasing)

- Screening Values

VOC content (g/l)	Pts
0-24	10
25-49	9
50-74	8
75-99	6
100-149	5
150-199	4
200-299	3
300	2
>300	0

Global Warming Potential (GWPs)

- GWP
  - Used to compare the ability of different greenhouse gases to trap heat in the atmosphere
  - Based on
    - Heat-absorbing ability of the gas relative to base chemical → carbon dioxide (CO_2)
    - Decay rate of each gas relative to CO_2

GWPs

- Some greenhouse gases occur naturally in the atmosphere
  - Include water vapor, carbon dioxide, methane, nitrous oxide, and ozone
- Others result from human activities
  - Very powerful greenhouse gases that are generated in a variety of industrial processes, including cleaning processes

GWP Score	Pts
GWP = 0	10
GWP = 1 (CO2)	5
All others =	0

Ozone Depletion Potential (ODPs)

- Ozone layer screens out the sun's harmful ultraviolet radiation
  - Small amounts of ozone are constantly being made by the action of sunlight on oxygen
  - At the same time, ozone is being broken down by natural processes
  - The total amount of ozone usually stays constant because its formation and destruction occur at about the same rate
  - Human activity has recently changed that natural balance

ODPs

- The ratio of the amount of ozone depletion of a chemical compared to the amount of ozone depletion of the same mass of CFC-11
- Certain manufactured substances can destroy stratospheric ozone much faster than it is formed

ODP Points	Pts
ODP = 0	10
All others =	0

Hazardous Material Information System/ National Fire Protection Association (HMIS/NFPA)

- HMIS
  - Hazard Communication standard requires employers to evaluate materials and inform employees of the hazards
  - Developed by comparing information on the health hazard, flammability, and physical hazard of the product to a set of criteria for each hazard category
- NFPA
  - Originally developed this set of hazard rankings for their own purposes
  - The rankings have proven to be very useful in the chemical industry

HMIS/NFPA

- HMIS/NFPA
  - Health
  - Fire
  - Reactivity/Instability
- Lab attempts to use products with a hazard less than 3
  - Products receive lower screening score

- 4 = Severe Hazard
- 3 = Serious Hazard
- 2 = Moderate Hazard
- 1 = Slight Hazard
- 0 = Minimal Hazard

HMIS/NFPA

- Individual Indicator Scores
  - Add up HMIS/NFPA for each category
  - Use table to determine the number of points to assess

HMIS/NFPA Point Assessment		
Total	Pts	Examples
0	10	H-0 F-0 R-0
1	9	H-0 F-0 R-1, H-0 F-1 R-0
2	8	H-1 F-1 R-0, H-2 F-0 R-0
3	7	H-1 F-1 R-1, H-2 F-1 R-0
3	2	H-3 F-0 R-0
4	6	H-2 F-2 R-0, H-1 F-2 R-1
4	1	H-1 F-3 R-0
5	5	H-2 F-2 R-1
5	0	H-1 F-3 R-1, H-2 F-3 R-0
6	4	H-2 F-2 R-2
6	0	H-3 F-3 R-0
7, 8, 9	0	H-3 F-3 R-1, H-3 F-3 R-2

pH Readings

- Provides a measure on a scale from 0 to 14 of the acidity or alkalinity of a solution
  - = 7 → neutral
  - <7 → acidic
  - >7 → basic
- Try to avoid
  - >11 → very basic, likely to cause corrosion and/or tissue damage
  - <2.5 → a strong acid

pH

- Neutral substances receive the highest Individual Indicator points
- Both very acidic and very basic are both avoided

pH	Pts
0-1.0	0
1.1-2.4	4
2.5-2.9	6
3.0-4.0	7
4.1-5.9	8
6.0-6.4	9
6.5-7.5	10
7.6-8.9	9
9.0-9.9	8
10-11.4	7
11.5-11.9	6
12-12.4	4
12.5-12.9	2
13-14	0

Search by Safety Screening Criteria

By individual criteria

Safety Screening Search

Search for cleaners matching minimum safety or environmental criteria.

VOC Content	Global Warming Potential	Ozone Depletion Potential	HMIS/NFPA Rating	pH Range
Maximum: 100 grams/liter	GWP: No potential	ODP: No potential	Maximum H: 1 Maximum F: 1 Maximum R: 1	Minimum: 8 Maximum: 10

Overall Safety Score Range

Minimum: Any Maximum: Any

Reset Submit

Or - search by total screening score

VOC Content	GWP/ODP	HMIS/NFPA Rating	pH Range
Maximum: Any grams/liter	Global Warming Potential: Any Ozone Depletion Potential: Any	Maximum H: Any Maximum F: Any Maximum R: Any	Minimum: Any Maximum: Any

Overall Safety Score Range

Minimum: 40 Maximum: 50

Safety Screen Search Results

Safety Screening Search Results | Search Again

Current Search Information

Search Criteria
VOC Content: <= 100
Global Warming Potential: No Potential
Ozone Depletion Potential: No Potential
HMIS/NFPA Maximum H Rating: <= 1
HMIS/NFPA Maximum F Rating: <= 1
HMIS/NFPA Maximum R Rating: <= 1
pH: >= 8
pH: <= 10

Results
Found 70 records
Showing records 1 - 50

Help
Search Results Field Definitions
Contact the lab

<< < **Showing records 1 - 50 of 70** > >>

Vendor Name	Product Name	Classification	Safety Score
1st Envirosafety	Ecco Commercial Cleaner	Organic	48
1st Envirosafety	Organic Cleaner/Degreaser	Organic	48
1st Envirosafety	Quick Shine Wash & Polish	Organic	48
1st Envirosafety	Stay Clean Collodial Glass Cleaner	Organic	48
Alconox Inc	Alconox	Powder Detergent	47
Alconox Inc	Liquinox	Alkaline Aqueous	49
Alconox Inc	Terg-A-Zyme	Enzymatic/Microbial	47
AW Chesterton	181 Low Alkaline Cleaner	Alkaline Aqueous	46
AW Chesterton	KPC 820 N	Alkaline Aqueous	46
Baum's Castorine Company Inc	EZE Oil-Grease Cleaner	Alkaline Aqueous	43
Baum's Castorine Company Inc	Protecto Clean 148	Alkaline Aqueous	47
Bi-O-Kleen Industries	Citrus Soy Solvent Cleaner & Degreaser	Ester	47
Bi-O-Kleen Industries	SL 100	Organic	47
Bi-O-Kleen Industries	Soy Cream Cleaner	Organic	47
Buckeye International	Shopmaster HP	Alkaline Aqueous	45
Buckeye International	Shopmaster LPH	Alkaline Aqueous	48
Chemical Technologies	Green Thunder	Alkaline Aqueous	47
Cogent Environmental Solutions	DFC 105	Neutral Aqueous	48

Side-by-Side Selection

Compare Products

Vendor Search Results | Search Again

Current Search Information

Search Criteria	Results	Help
Classification: Organic Semi-Aqueous Terpene Terpene-Semi-Aqueous Contaminant: Cutting/Tapping Fluids	Found 71 records Showing records 1 - 50	Search Results Field Definitions Contact the lab

<< < **Showing records 1 - 50 of 71** > >>

	Vendor Name	Product Name	Classification	Safety Score
☐	1st Envirosafety	Ecco Commercial Cleaner	Organic	48
☐	1st Envirosafety	Organic Cleaner/Degreaser	Organic	48
☒	Bio Chem Systems	Bio T Max	Terpene-Semi-Aqueous	37
☐	Bio Chem Systems	Bio T Parts Washer NR	Terpene	37
☐	Bio Chem Systems	Bio T V 50	Terpene	46
☐	Bio Chem Systems	BioBrake	Terpene	37
☐	Bi-O-Kleen Industries	Soy Cream Cleaner	Organic	47
☐	Brulin Corporation	Airshow W	Organic	34
☐	Bush Boake Allen Inc	BBA Solvent K312	Terpene	37
☐	Calgon Corporation	Geo Guard 5210	Semi-Aqueous	38
☐	Calgon Corporation	SC 431	Organic	37
☐	Chemtronics Inc	Super Bio Wash	Semi-Aqueous	48
☐	CRC Industries	Complex Blue	Semi-Aqueous	43
☐	Diversey Corporation	Dusqueeze	Semi-Aqueous	47
☐	Diversey Corporation	Jettacin	Terpene-Semi-Aqueous	42
☐	Diversey Corporation	Twist	Terpene	41
☐	Ecolink	Rip Tide	Terpene	43
☐	Ecolink	Vortex	Semi-Aqueous	37
☐	Finger Lakes Chemical	3 D Degreaser	Terpene	45
☐	Finger Lakes Chemical	ID/4R	Terpene	44
☐	Finger Lakes Chemical	Safer Stuff	Terpene	43
☐	Florida Chemical Company	Citrus Burst 7	Terpene	37
☒	Florida Chemical Company	D-Limonene	Terpene	37
☐	Gemtek Products	EZ Solv	Organic	39
☒	Gemtek Products	Maxi Solv	Organic	37
☐	Gemtek Products	SC Oven & Grill Cleaner	Organic	47

Side-by-Side Product Comparisons

Vendor Information

Compare Products

Compare up to three products. To select products, search or browse the database and press the compare button next to products that best meet your criteria.

Bio T Max	D-Limonene	Maxi Solv
Vendor Provided Information Product information cited in this section is supplied directly by the vendors. The Institute has not verified the accuracy of any of this information and is not liable for any claims made by the vendors. TURI is likewise not responsible for any typographical errors. **Vendor Name:** Bio Chem Systems **Product Classification:** Terpene-Semi-Aqueous **Recommended Contaminants:** Adhesive, Buffing/Polishing Compounds, Cutting/Tapping Fluids, Greases, Inks, Lubricating/Lapping Oils, Mold Releases, Oil, Resins/Rosins, Waxes **Recommended Equipment:** Cold Solvent, Immersion/Soak, Low Pressure Spray, Manual Wipe **Recommended Substrates:** Alloys, Aluminum, Brass, Carbon Steel, Ceramics, Copper, Galvinized Steel, Glass/Quartz, Gold, Nickel, Plastic, Rubber, Stainless Steel, Steel, Sterling/Silver, Tin **MSDS / TDS:** Bio T Max MSDS, Bio T Max TDS	**Vendor Provided Information** Product information cited in this section is supplied directly by the vendors. The Institute has not verified the accuracy of any of this information and is not liable for any claims made by the vendors. TURI is likewise not responsible for any typographical errors. **Vendor Name:** Florida Chemical Company **Product Classification:** Terpene **Recommended Contaminants:** Adhesive, Carbon Deposits, Cutting/Tapping Fluids, Fluxes, Greases, Inks, Lubricating/Lapping Oils, Mold Releases, Oil, Paints, Resins/Rosins, Waxes **Recommended Equipment:** Immersion/Soak, Manual Wipe **Recommended Substrates:** Aluminum, Brass, Carbon Steel, Ceramics, Copper, Electronics, Fiberglass, Galvinized Steel, Glass/Quartz, Iron, Nickel, Stainless Steel, Steel, Titanium	**Vendor Provided Information** Product information cited in this section is supplied directly by the vendors. The Institute has not verified the accuracy of any of this information and is not liable for any claims made by the vendors. TURI is likewise not responsible for any typographical errors. **Vendor Name:** Gemtek Products **Product Classification:** Organic **Recommended Contaminants:** Adhesive, Carbon Deposits, Coatings, Cutting/Tapping Fluids, Fluxes, Inks, Paints, Resins/Rosins, Waxes **Recommended Equipment:** Cold Solvent, Immersion/Soak, Manual Wipe **Recommended Substrates:** Aluminum, Stainless Steel, Titanium **MSDS / TDS:** Maxi Solv MSDS

Side-by-Side Continued

Lab Info

Bio T Max	D-Limonene	Maxi Solv
Safety Score | Help	**Safety Score** | Help	**Safety Score** | Help
Indicator **Value** **Points** VOC: 780 0 GWP: 0 10 ODP: 0 10 HMIS H: 0 HMIS F: 2 8 HMIS R: 0 pH: 8 9	**Indicator** **Value** **Points** VOC: 798 0 GWP: 0 10 ODP: 0 10 NFPA H: 1 NFPA F: 2 7 NFPA R: 0 pH: NA 10	**Indicator** **Value** **Points** VOC: 1000 0 GWP: 0 10 ODP: 0 10 HMIS H: 1 HMIS F: 2 7 HMIS R: 0 pH: NA 10
Total: 37	**Total: 37**	**Total: 37**
Client Testing **Tested Contaminants:** Adhesive, Alcohol, Buffing/Polishing, Compounds, Coatings, Dirt, Films, Fluxes, Greases, Inks, Latex, binder, Lubricating/Lapping, Oils, Mold, Releases, Oil, Paints, Phthalates, Pitch, Resins/Rosins, Salts, Solvent, Starch, Waxes, Waxes, solder **Tested Substrates:** Aluminum, Aluminum, Brass, Ceramics, Copper, Electronics, Glass/Quartz, Liquid, Other, Plastic, Stainless, Steel, Steel, Teflon, Textile, Titanium **Tested Equipment:** Immersion/Soak, Immersion/Soak, Manual, Wipe, Mechanical, Agitation, Ultrasonics **Number of Trials:** 124 (95 effective/29 ineffective)	**Client Testing** **Tested Contaminants:** Carbon, Deposits, Carbon, Deposits, Greases, Mold, Releases, Oil **Tested Substrates:** Aluminum **Tested Equipment:** Immersion/Soak, Immersion/Soak, Low, Pressure, Spray, Ultrasonics **Number of Trials:** 12 (9 effective/3 ineffective)	**Client Testing** **Tested Contaminants:** Inks, Lubricating/Lapping, Oils, Paints, Resins/Rosins, Waxes **Tested Substrates:** Ceramics, Other, Plastic, Stainless, Steel, Steel, Teflon, Textile **Tested Equipment:** Immersion/Soak, Manual, Wipe, Mechanical, Agitation, Ultrasonics **Number of Trials:** 8 (8 effective/0 ineffective)

Guiding Future Work

- Tracking what people are looking for
  - Identifying gaps in testing data
    - See example table
- SSL work focus on filling in the blanks
  - If you don't find it, come back soon and try again
  - Or contact us to arrange for testing specific to your needs

Testing Needs from Web Requests

search method	contaminant	substrate	equipment	solvent	results
vendor_search	Oil	Steel	Immersion/Soak		309
vendor_search	Oil	Steel	Immersion/Soak		309
solvent_replace	Oil	Steel	Immersion/Soak	Naptha	0
Find_a_Cleaner	Lubricating/Lapping Oils	Plastic	Any		7
Find_a_Cleaner	Oil	Plastic	Any		125
vendor_search	Waxes	Any	Any		5
vendor_search	Waxes	Any	Any		5
vendor_search	Waxes	Any	Any		5
vendor_search	Waxes	Any	Any		5
vendor_search	Waxes	Any	Any		5
vendor_search	Any	Any	Any		1
Find_a_Cleaner	Adhesive	Wood	Manual Wipe		0
Find_a_Cleaner	Adhesive	Wood	Immersion/Soak		0
Find_a_Cleaner	Stickies	Wood	Immersion/Soak		0
Find_a_Cleaner	Stickies	Wood	Any		0
Find_a_Cleaner	Lubricating/Lapping Oils	Titanium	Immersion/Soak		0
Find_a_Cleaner	Lubricating/Lapping Oils	Titanium	Low Pressure Spray		0
Find_a_Cleaner	Cutting/Tapping Fluids	Titanium	Low Pressure Spray		0
Find_a_Cleaner	Lubricating/Lapping Oils	Titanium	Low Pressure Spray		0
Find_a_Cleaner	Lubricating/Lapping Oils	Titanium	Immersion/Soak		0
Find_a_Cleaner	Greases	Titanium	Any		20
solvent_replace	Fluxes	Ceramics	Immersion/Soak	Trichloroethylene	0
solvent_replace	Fluxes	Ceramics	Manual Wipe	Trichloroethylene	0
solvent_replace	Any	Ceramics	Manual Wipe	Trichloroethylene	0
solvent_replace	Any	Ceramics	Any	Trichloroethylene	0
Find_a_Cleaner	Carbon Deposits	Brass	Ultrasonics		0
Find_a_Cleaner	Carbon Deposits	Brass	Immersion/Soak		0
Find_a_Cleaner	Carbon Deposits	Brass	Any		0

In the Works

- Photo gallery
  - Search by part description
  - Determine relevance to your situation
- Filter search by cleaning types
  - Screening will return only products that match your field of cleaning
    - Parts
    - Precision
    - Facility

CleanerSolutions

- Check it out on-line to start your search for a new cleaning method
  - www.cleanersolutions.org
- Remember, It All Depends
  - The products you find should be tested on your specific soils following your current cleaning process
  - Time, temperature, equipment
- TURI's Lab can help you in this process